

<b>Title:</b> Moving from compensation to exemption from the costs of the Renewables Obligation for energy-intensive industries  <b>IA No:</b> DECC0235  <b>Lead department or agency:</b> Department for Business, Energy and Industrial Strategy  <b>Other departments or agencies:</b>	<b>Impact Assessment (IA)</b>		
	<b>Date:</b> 19/07/2017		
	<b>Stage:</b> Final		
	<b>Source of intervention:</b> Domestic		
	<b>Type of measure:</b> Secondary Legislation		
<b>Contact for enquiries:</b> christian.milhan@beis.gov.uk			
<b>Summary: Intervention and Options</b>			<b>RPC Opinion:</b> Not applicable

Cost of Preferred (or more likely) Option			
Total Net Present Value	Business Net Present Value	Net cost to business per year (EANCB on 2014 prices)	In scope of One-In, Two-Out? Measure qualifies as
£132.5m	£124.8m	£124.8	NO   N/A

**What is the problem under consideration? Why is government intervention necessary?**

The Renewables Obligation (RO) is one of the policies that Government has put in place to incentivise investment in renewable electricity generation. The costs of these schemes are borne by electricity bill payers. For energy-intensive industries (EIs), this can undermine competitiveness, as competing businesses in other countries may not be subject to similar energy and climate change policy costs. The Government has sought to lessen the cost disadvantage faced by EIs as a result of energy and climate change policy costs, relative to their EU and international competitors, through a compensation scheme. A move to an exemption scheme is proposed in order to increase the certainty and effectiveness of support to EIs.

**What are the policy objectives and the intended effects?**

The objectives of the policy are twofold:

- Firstly, to continue supporting EIs in order to maintain competitiveness for these industries by reducing the costs of the RO scheme.
- Secondly, to do so in the most effective way by moving to an exemption scheme. Making the proposed amendments to legislation to deliver an exemption from a proportion of the costs of the RO scheme provides increased certainty and real-time support. An exemption is not contingent upon departmental budgets, which can fluctuate. This increased certainty, in turn, can lead to cost savings admissible for the purpose of raising or servicing debt and thereby help maintain competitiveness of EIs, which could reduce the risks of investment and carbon leakage.

**What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)**

The policy options considered are as follows:

- Do nothing:** Continue with supporting EIs with a compensation scheme.
- Option 1 (preferred):** Move from compensation to implementing an exemption scheme through amendments to legislation from 1 January 2018 (subject to Parliamentary and state aid approvals). This provides an exemption from a proportion of the indirect costs of the RO scheme in respect of up to 85% of electricity supplied to eligible EIs. These EIs consist of businesses which pass a sector and business-level test and will also be eligible for the CFD exemption. The electricity intensity threshold is set at 20%, as set out in the consultation.

<b>Will the policy be reviewed? It will be reviewed. If applicable, set review date: 01/2023</b>					
Does implementation go beyond minimum EU requirements?				N/A	
Are any of these organisations in scope? If Micros not exempted set out reason in Evidence Base.		<b>Micro</b> No	<b>&lt; 20</b> No	<b>Small</b> Yes	<b>Medium</b> Yes
What is the CO <sub>2</sub> equivalent change in greenhouse gas emissions? (Million tonnes CO <sub>2</sub> equivalent)				<b>Traded:</b> N/A	<b>Non-traded:</b> N/A

*I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.*

Signed by the responsible Minister: \_\_\_\_\_ Claire Perry \_\_\_\_\_ Date: \_\_\_\_\_ 17/07/2017 \_\_\_\_\_

# Summary: Analysis & Evidence

# Policy Option 1

**Description:** This preferred option provides an exemption from the indirect costs of the RO for up to 85% of eligible electricity to sectors in Great Britain which pass eligibility criteria set out in Guidance (March 2017<sup>1</sup>) from 1 January 18 to 31 March 2028.

## FULL ECONOMIC ASSESSMENT

Price Base Year2016	PV Base Year2017	Time Period Years 10	Net Benefit (Present Value (PV)) (£m)		
			Low: Net positive	High: Net positive	Best Estimate: 132.5

COSTS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	3.0	0.9	10.8
High	11.8	5.0	55.0
Best Estimate	5.9	1.9	22.5

### Description and scale of key monetised costs by 'main affected groups'

There will be one-off and ongoing administrative costs for Ofgem and energy suppliers which are reflected in the NPV. An exemption provided to industry will also narrow the base of consumption from which total RO support costs are recovered, and therefore increase electricity costs per unit for households and non-exempt businesses, which is a transfer. The average annual total value of the exemption (in terms of money saved by ELLs) is around £196m for eligible ELLs (see table 7). Our estimate of the average annual impact on electricity bills to households and non-exempt businesses is set out in chapter 9.

### Other key non-monetised costs by 'main affected groups'

Our analysis suggests that there will be a very small increase in the number of fuel poor households. For non-exempt businesses, which will experience an increase in their electricity costs, there may be an impact on their decisions on employment, output and investment. For some energy suppliers, there may also be an impact on their competitiveness.

BENEFITS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	N/A	Net positive	Net positive
High	N/A	Net positive	Net positive
Best Estimate	N/A	Net positive	154.9

### Description and scale of key monetised benefits by 'main affected groups'

The exemption provides increased certainty and real time support, compared with compensation where eligible ELLs are being compensated for historical consumption levels. We estimate that the present value of this benefit (the perceived value of the stream of compensation scheme payments vs exemption scheme payments) over 10 years is around £154.9m (best case). See methodology in Annex C.

### Other key non-monetised benefits by 'main affected groups'

As set out above this increased certainty may enable ELLs to raise or service debt at a lesser cost while maintaining their target debt service coverage ratios (which we have been able to quantify), but may also free up working capital which can be deployed elsewhere (which we have not been able to quantify). Taken together, these effects may have wider beneficial impacts on output, investment and employment decisions. Moreover, there may be a lower risk of investment and carbon leakage. Moreover, there may be a lower risk of investment and carbon leakage.

<b>Key assumptions/sensitivities/risks</b>	<b>Discount rate (%)</b>	3.5%
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Key assumptions include how many firms will be eligible for the exemption and their electricity demand. In terms of risks, as the exemption is based on the volume of electricity supplied there may be reduced imperative for ELLs to invest in energy efficiency measures and therefore increases in carbon emissions. Secondly, there may also be a 'rebound effect'. As the per unit electricity cost decreases for eligible ELL firms as a result of the exemption, this may incentivise ELLs to expand output and thereby increase carbon emissions.

## BUSINESS ASSESSMENT (Option 1)

<b>Direct impact on business (Equivalent Annual) £m:</b>			<b>In scope of OITO?</b>	<b>Measure qualifies as</b>
Costs: 124.8	Benefits: N/A	Net: 124.8	No	N/A

<sup>1</sup> <https://www.gov.uk/government/consultations/energy-intensive-industries-exemption-from-indirect-costs-of-the-contracts-for-difference-scheme>

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## 1. Background

1. This final stage IA provides an updated assessment (the previous consultation stage IA was published on 1 April 2016 alongside the consultation [1]<sup>2</sup> – see Annex A on literature) of the impact of the proposal to shift from compensation for EILs from the indirect costs of the RO to implementing an exemption in Great Britain. Following the analysis of responses to the consultation which closed on 26 May 2016, answers and evidence to Questions 1 (on the benefit to EILs of implementing an exemption), 2 (the impact of increased electricity bills to non-exempt businesses) and 3 (the impact of increased electricity bills to non-exempt households) have been incorporated into this IA.
2. Furthermore, we have (i) expanded on our analysis of the impact of the policy on fuel poverty, (ii) updated our estimates of exempt electricity supplied to EILs, (iii) updated the one-off and on-going administrative costs to Ofgem and energy suppliers, (iv) updated our estimates of the RO policy costs in line with the March 2017 publication of the Office of Budget Responsibility [2], (v) updated our estimates of electricity sales in Great Britain (in line with our revised Energy and Emissions Projections published in March 2017 [3], and estimated some of the benefits to EILs from the increased certainty of moving from compensation to exemption (see Section 8.1).
3. The scope of this IA relates to implementing an exemption for EILs from the indirect costs of the RO scheme and businesses which passed the eligibility criteria set out in Guidance (March 2017) only. We will respond on implementing an exemption for EILs from the indirect costs of the FIT scheme in due course.

## 2. Problem under consideration

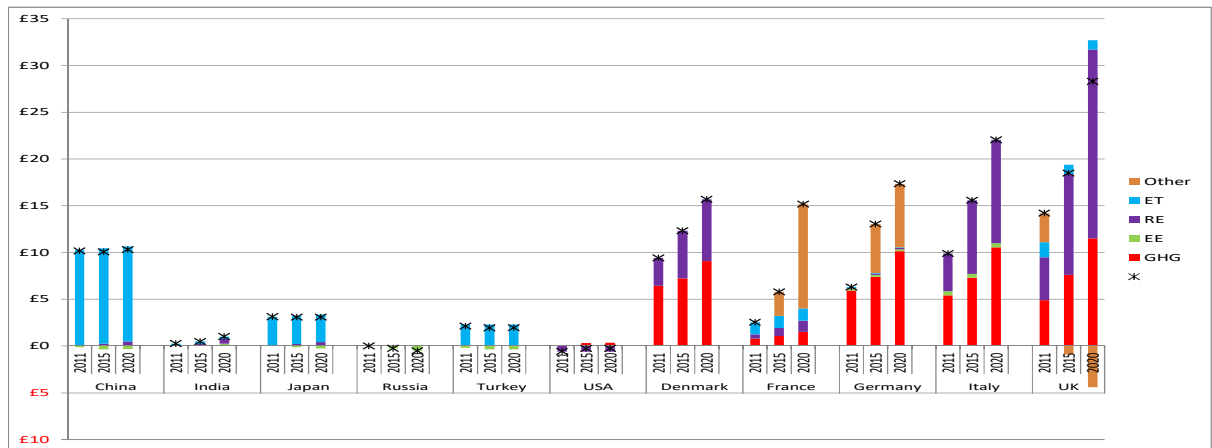
4. A key element of the Government's approach to decarbonising energy is policies designed to incentivise generation of electricity from renewable sources. Specifically the Government has put in place the Renewables Obligation (RO) scheme to encourage investment into the UK's renewable energy infrastructure. The costs of the scheme are passed on by suppliers to consumers (households and businesses alike).
5. The Government recognises that, in the short to medium term, the resulting increase in retail electricity prices risks reducing the competitiveness of the UK's most electricity-intensive businesses where they are operating in internationally competitive markets.
6. A study by ICF International (2012) [4] on international comparisons of energy and climate change policy costs, such as those shown in chart 1 below, suggest that policy costs faced by EILs in the UK may be much higher compared with other countries. The chart below takes into account the exemptions that existed at the time of publication for industry in other countries and assumes no such exemption for UK-based EILs. Within the EU, the governments of Belgium (Flanders), Denmark, Germany, Republic of Ireland, Norway and Sweden currently make provision in their renewable energy support schemes for supporting EILs. There are a wide range of approaches to reducing costs. While the existing compensation scheme will reduce policy costs for UK-based businesses, a move from compensation to exemption will not only continue support but also increase the certainty of support.
7. A recent report by the Committee on Climate Change [5] also suggests that average industrial electricity prices, inclusive of taxes and levies, are relatively high in the United Kingdom. The Committee also commissioned Cambridge Econometrics<sup>3</sup> (CE) to estimate electricity prices for electro-intensive firms in the UK and key international competitors in 2016 and 2030. CE focused on key competitor countries where we have the most imports/exports: Germany, USA, China, Netherlands, France, Belgium and Ireland. Some of the key findings are that (i) the UK electricity prices for industrial sectors based on Eurostat data are relatively high compared to other countries and (ii) an electricity price gap between the UK and other countries is likely to persist until 2030, due to increases in wholesale gas prices and support for low-carbon generation.

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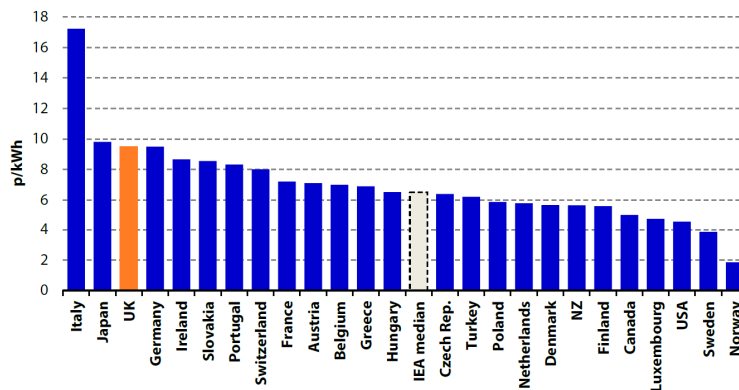
<sup>2</sup>[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/518477/EIL\\_Exemption\\_RO\\_and\\_FIT\\_IA\\_Signed\\_For\\_Publication\\_1\\_April\\_2016\\_Annex\\_Up.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/518477/EIL_Exemption_RO_and_FIT_IA_Signed_For_Publication_1_April_2016_Annex_Up.pdf)

<sup>3</sup> Cambridge Econometrics (2017), Competitiveness impacts of carbon policies on UK energy-intensive industrial sectors to 2030, [www.theccc.org.uk](http://www.theccc.org.uk).

**Chart 1: Indicative incremental impacts in 2011, 2015 and 2020 on electricity retail prices (£/MWh, 2010 prices) of energy and climate change policies, Source: ICF International (2012) [2]<sup>4</sup>**



**Chart 2: Average industrial electricity prices (with taxes and levies), Source: Committee on Climate Change (2017)**



8. Where EILs operate in global markets they may be less likely to be able to pass through increases in these costs to the price of their products. To do so would make their products relatively more expensive compared to European and international competitors not facing similar policy costs, thus placing them at a competitive disadvantage. Therefore, electricity price increases may pose a risk to the competitiveness of UK-based EILs. As a result, EILs may move their current production abroad and undertake future investment overseas in countries with lower policy costs than the UK. This may reduce GHG emissions in the UK, but increase them abroad in the case of investment leakage and carbon leakage.
9. Please also see paragraphs 181 and 182 of the European Energy and Environmental Guidelines (EEAG) [3], which sets out that “to avoid that undertakings particularly affected by the financing costs of renewable energy support are put at a significant competitive disadvantage, Member States may wish to grant partial compensation for these additional costs.” According to a study by the ‘Fraunhofer ISI’ and ‘Ecofys’ from July 2015 [4], a number of countries have designed various rules regarding exemptions and rebates to limit the burden on especially energy-intensive industries.

### 3. Rationale for intervention

10. There is currently a scheme in place to compensate eligible EILs from the indirect costs of the RO and FIT schemes for up to 85% of their eligible electricity. However, it may not provide EILs with sufficient certainty beyond the parliamentary term as compensation is contingent upon departmental budgets which can fluctuate, whereas an exemption provides greater certainty compared to compensation over the longer term.

<sup>4</sup> The different elements in the figures include: ‘GHG’ – the incremental cost of GHG policy measures e.g. EU ETS; ‘EE’ – the incremental costs of Energy Efficiency policy measures; ‘RE’ – the incremental costs of Renewable Energy policy measure; ‘ET’ – the incremental costs of Energy Taxes; and ‘Other’ – the incremental costs of other policies including Energy policy

11. This increased certainty, in turn, can help maintain competitiveness of EIs in two ways. Firstly, as EIs will be supported in real time (compensation is paid in arrears) this 'frees up' working capital which can be deployed elsewhere. Secondly, EIs may be able to raise or service debt at a lesser cost while maintaining their target debt service coverage ratios. This is because the increased certainty of an exemption set out in legislation may be seen by banks which are lending to EIs as less risky and thus may lower the interest rate on loans. This may have further beneficial impacts on output, investment and employment decisions. Moreover, this may also reduce the risk of investment and carbon leakage.
12. Therefore Government is committed to continue supporting the most electricity-intensive industries in line with the European Commission's published guidelines.

#### 4. Policy objectives

13. The Government is seeking to achieve two objectives;
  - Firstly, to continue supporting energy-intensive industries in order to maintain competitiveness for these industries by reducing the costs of the RO scheme incurred;
  - Secondly, to do so in the most effective way by changing to an exemption scheme. Making the proposed amendments to legislation to deliver an exemption from a proportion of the costs of the RO scheme provides increased certainty and real-time support, which in turn maintains competitiveness of EIs.
14. Making the proposed amendments to legislation to deliver an exemption addresses these two objectives. Non-regulatory or non-spending approaches are deemed not to address the two policy objectives sufficiently. It is intended that the compensation scheme will move to an exemption scheme from 1 January 2018, subject to Parliamentary and state aid approvals.

#### 5. Overview of eligible sectors, electricity supplied to EIs and policy costs

15. The purpose of this section is to provide the reader with an overview of the eligible electricity-intensive sectors, electricity supplied in the United Kingdom and the policy costs of the Renewables Obligation.

##### 5.1. Eligible sectors

16. The tables in annex B outline sectors that are eligible for compensation from the RO scheme.
17. The European Energy and Environmental Guidelines (EEAG) [6] set out which sectors can be eligible for relief from the indirect costs of renewables (Annex B, Table A). To ensure that support in the UK is targeted at those businesses that are most at risk, eligibility is further limited to those sectors which are electricity-intensive and subject to international competitive pressures. To be eligible, sectors must also have a trade intensity of at least 4% and an electricity-intensity of at least 7% using UK data.

##### 5.2. Estimated electricity supplied to energy-intensive industries

18. This section sets out the final estimated amount of exempt electricity supplied to eligible EIs (see Table 1).
19. These revised estimates are based on actual applications for the current compensation scheme which have been processed up to and including December 2016. Moreover, we have estimated the potential 2017/18 eligible electricity using micro data of business energy use in eligible sectors for direct competitors from the Annual Business Survey from 2012 (year of the most recent available data).

**Table 1: Estimated average annual electricity supplied (TWh) to EIs<sup>5</sup> (at 20% electricity intensity); Source: Department for Business, Energy and Industrial Strategy (BEIS)**

	Low	Best	High
Electricity supply to EIs (TWh)	6.7	11.7	16.7

<sup>5</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/603597/eis-exemption-from-indirect-costs-cfd-electricity-supply-estimates.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/603597/eis-exemption-from-indirect-costs-cfd-electricity-supply-estimates.pdf)

### 5.3. Estimated costs of the Renewable Obligation and value of exemption

20. This section provides an overview of the latest RO policy cost to which the proposed exemption applies.

21. According to the latest central projections by BEIS<sup>6</sup>, published by the Office for Budget Responsibility (OBR) in March 2017 [2], the total costs of the RO scheme across the UK are estimated to be £5.4bn in 2017/18 rising to £7.0bn in 2021/22 (nominal prices). The costs are estimated to remain at this level until 2026/27 and then are expected to fall thereafter as the first accredited stations will start to end their term of support under the RO, as set out in in the RO legislation.

**Table 2: Projected central RO costs by year (nominal prices, £bn); Source: Office of Budget Responsibility (OBR) [7]**

	2017/18	2018/19	2019/20	2020/21	2021/22
<b>RO costs (£bn)</b>	5.4	6.3	6.6	6.8	7.0

22. Please note that from this section onwards, we present the projected bill impacts and additional costs associated with implementing an exemption through changes to the RO legislation in 2016 prices, as we believe this will be more relevant to the reader. The exemption will not be introduced for the RO in Northern Ireland at this stage (see accompanying Government Response document), thus only the GB proportion has been used of the RO policy costs.

23. Without the exemption, the average policy costs to households of the RO scheme are estimated at around £62 per annum and for electricity only households around £105 per annum (from 1 January 2018 to 31 March 2028). For small business energy users it is around £4,300 per annum, for medium business energy users around £181,200 per annum and for large sized energy users it is around £1.7m per annum. All estimates are in 2016 prices<sup>7</sup>.

**Table 3: Projected average contribution to bills<sup>8</sup> (£, 2016 prices) of RO policy costs households and businesses in Great Britain, without exemption, over 2017/18<sup>9</sup> to 2027/28**

	Low estimate	Best estimate	High estimate
Average impact across all households (dual fuel)	£41	£62	£73
Average impact across all households (electricity only)	£69	£105	£123
Small business energy user	£2,800	£4,300	£5,000
Medium-sized energy user	£120,000	£181,200	£212,300
Large sized energy user	£1,120,000	£1,700,000	£1,990,000

## 6. Options considered

24. One option has been considered, relative to 'do nothing' the counterfactual:

- **'Do nothing'**: This means no exemption is implemented and the current compensation scheme to compensate eligible energy-intensive industries from the indirect costs of the RO scheme for up to 85% of their eligible electricity continues. The compensation scheme is paid through Departmental budgets and thus through the taxpayer.
- **Option 1 (preferred)**: Move from compensation to implementing an exemption scheme through amendments to legislation from 1 October 2017 subject to Parliamentary and state aid approvals. This provides an exemption to EILs from the costs of the RO scheme for up to 85% of electricity

<sup>6</sup> These projections have been provided through the Levy Control Framework (LCF) Working Group, <https://www.gov.uk/government/collections/levy-control-framework-lcf>

<sup>7</sup> These estimates have been calculated in accordance with Department's Model used for the Price and Bills Report, <https://www.gov.uk/guidance/policy-impacts-on-prices-and-bills>

<sup>8</sup> The definitions of small business energy user, medium sized energy user and large sized energy user are based on the definition from 'Eurostat' (Eurostat size band IB): A small business energy user is defined as consuming between 20MWh and 499MWh electricity per annum (the midpoint was used in the impact assessment); a medium-sized energy user defined as using 11,000 MWh electricity (the midpoint was used in the impact assessment); and a large sized energy user is defined as using 100,000MWh electricity.

<sup>9</sup> This includes only January to March of 2018.

used for eligible businesses. These ELLs consist of businesses which pass a sector and business-level test and will also be eligible for the CFD exemption. The electricity intensity threshold is set at 20%, as set out in the consultation.

25. This option has been assessed in the following chapters against the reference case, which is to continue supporting energy-intensive businesses with a compensation scheme.

## 7. A description of the associated costs and benefits of policy options

26. This section outlines the impact of switching from compensation to implementing an exemption through changes to RO legislation.

27. Moving from compensation to implementing the exemption changes the way in which support to ELLs is paid and who pays for it.

28. The total electricity sales (which includes ELLs) are to be around 280 TWh in Great Britain on average over 2017/18 to 2027/28, see Table 4. Compared with the previous consultation stage IA<sup>10</sup>, the average annual value of the exemption has fallen due to an update in the amount of amount of electricity supplied to eligible ELLs<sup>11</sup> and revised estimates of UK electricity sales projections.

29. Please note that as the projected amount of electricity supplied each year varies, the additional average bill contributions for non-exempt businesses and households will vary by year, relative to the 'do nothing' approach.

**Table 4: Projected GB electricity sales (TWh) prior to exemption, Source: BEIS (2017)<sup>12</sup>, Energy and Emissions Projections [3]**

Year	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	Average
(TWh)	292	284	276	273	273	273	275	278	280	285	291	280

30. Under compensation, ELLs are compensated for the costs of the RO and FITs schemes and this is paid for by Government through tax revenue, which would be saved if an exemption scheme is introduced.

31. Implementing an exemption through changes to legislation supports eligible ELLs directly by excluding a proportion of the electricity they consume (in this case up to 85%) from the RO obligation, and should result in lower electricity prices to ELLs. Any exemption provided to industry will narrow the base of consumption from which total RO support costs are recovered, and therefore increases electricity prices for non-exempt households and businesses. As such, moving from compensation to exemption redistributes the cost of supporting ELLs from tax payers to non-exempt electricity bill payers. Therefore moving from compensation to implementing an exemption through changes to legislation is a redistributive change that does not impose any additional costs in terms of the level of support provided, as it simply changes how support is paid.

32. There are, however, some additional resource costs and benefits associated with introducing an exemption:

- **Benefits:** increased certainty, compared with a compensation scheme, and real time support provided to ELLs by being exempt from the costs of RO. An exemption is not contingent upon departmental budgets which can fluctuate. This increased certainty, in turn, can help maintain competitiveness of ELLs in two ways. Firstly, as ELLs will be supported in real time this frees up working capital which can be deployed elsewhere. Secondly, the ELL may be able to raise or service debt at a lesser cost while maintaining their target debt service coverage ratios. This may have wider beneficial impacts on output, investment and employment decisions. Moreover, this may also reduce the risks of investment and carbon leakage.
- **Costs:** one-off and on-going administrative costs to Ofgem and energy suppliers associated with the introduction of an exemption. Note that the costs to society are not sensitive to the option chosen and therefore the same under both options considered.
- **Distributional impacts:** increase in electricity bills for households and non-exempt businesses; impacts on employment, output, investment of non-exempt businesses.

<sup>10</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/518477/ELL\\_Exemption\\_RO\\_and\\_FIT\\_IA\\_Signed\\_For\\_Publication\\_1\\_April\\_2016\\_Annex\\_Up.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/518477/ELL_Exemption_RO_and_FIT_IA_Signed_For_Publication_1_April_2016_Annex_Up.pdf)

<sup>11</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/545840/beis-16-18-estimate-of-eligible-renewables-obligation-and-feed-in-tariff-schemes-exempt-electricity-volume.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/545840/beis-16-18-estimate-of-eligible-renewables-obligation-and-feed-in-tariff-schemes-exempt-electricity-volume.pdf)

<sup>12</sup> Please note that the Department of Energy and Climate Change (DECC) and Department for Business, Innovation and Skills was renamed to the Department for Business, Energy and Industrial Strategy (BEIS) in July 2016.



33. To quantify these costs and benefits, where possible, and evaluate the overall impact of the preferred option, we compared implementing an exemption against a counterfactual case where compensation is granted.

## 8. Monetised costs and benefits of the options at the societal level

34. This section sets out the monetised impacts of moving from a compensation scheme to an exemption through changes to legislation.

### 8.1. Certainty and effectiveness of delivery of support

35. The main benefit to exempt ELLs by moving from compensation to implementing an exemption through changes to legislation is the (i) increased certainty from being exempt from a proportion of the costs of the RO scheme, and (ii) the way that support is provided which is more accurate and faster than compensation for each eligible firm, therefore improving cash flow.
36. With regards to (i) the exemption will be set out in legislation thus it may provide greater certainty, compared with compensation. An exemption is not contingent upon departmental budgets which can fluctuate. For example, changing the exemption from RO costs would require Parliamentary approval.
37. We have attempted to quantify the effect of increased certainty. We estimate that the present value of this increased certainty could be valued at around £154.9m (best estimate, over ten years, for eligible ELLs).
38. To calculate this figure we projected the cash flows of support paid under the compensation scheme in 2015 and proposed exemption scheme over ten years. Given the stream of support paid under compensation is likely to be perceived as less certain, we discount this at a higher required rate of return equal to the ELLs' Costs of Equity (CoEs).
39. We repeated the calculation for exemption but used the ELLs' Weighted Average Costs of Capital (WACCs) for discounting. WACCs are lower than the corresponding CoEs and our rationale in using them is that the risk perception of these benefits is likely to be the same as that of the overall company, its ability to operate and benefit from this policy.
40. We aggregated the impact (in present terms) of compensation and exemption for the set of ELLs. For a subset of ELLs that are privately owned, details about capital structure, WACC and CoEs are not readily accessible. We therefore used a weighted average of WACCs and/or CoE data from ELLs where this information was available. The full methodology is set out in Annex C.

### 8.2. One-off and on-going administrative costs to Ofgem and energy suppliers

41. Ofgem will need to amend its IT systems and processes to support the administration of the exemption which is estimated to be, according to Ofgem, a one-off cost of around £0.2m to £0.5m, with £0.3m being the best estimate (2016 prices). Furthermore, this may require an additional 1.0 FTE staff at a cost of around £0.04m to £0.06m, with £0.05m being the best estimate (see Table 5, 2016 prices).
42. Energy suppliers may experience one-off familiarisation costs and in addition may need to amend their systems and need on-going costs of identifying ELL customers, assessing and auditing supply volumes.
43. According to Ofgem's Annual Renewables Obligation Report for 2015/16, there are 70 licensed electricity suppliers in GB which have met their Obligation in 2015/16. Given the difficulty of not knowing, at this stage, how many ELLs may apply and will be eligible for the exemption and which energy suppliers they will buy their electricity from, we have therefore considered a range. In the high case it may affect all energy suppliers; our best estimate is that this may affect around half and in the low case around a quarter.
44. Furthermore, we estimate that the one-off and on-going costs to energy suppliers could be similar to Ofgem's estimates (yet larger in total due to the number of energy suppliers in the market). On aggregate, the one-off costs could range between £2.8m and £11.2m, with our best estimate being £5.6m. In terms of aggregate on-going costs, these could range between £0.7m and £4.5m per annum, with our best estimate being £1.9m (all in 2016 prices).

**Table 5: Estimated one-off and on-going costs to Ofgem and energy suppliers, £m 2016 prices, non-discounted; for Option 1, Source: Ofgem and BEIS (2017)**

£m	One-off costs to Ofgem	On-going costs to Ofgem per annum	One-off costs to energy suppliers	On-going costs to energy suppliers per

				<b>annum</b>
<b>Low estimate</b>	£0.2	£0.04	£2.8	£0.7
<b>Best estimate</b>	£0.3	£0.05	£5.6	£1.9
<b>High estimate</b>	£0.5	£0.06	£11.2	£4.5

### 8.3. Net present value of costs and benefits

45. Table 6 below summarises the estimated direct net monetised costs in NPV for Option 1 (as set out in the Table 5 above). We have not been able to estimate a low and high range due to limited data.

**Table 6: NPV range for Option 1, £m, 2016 prices, Rounded to nearest £m; Source, BEIS (2017)**

<b>£m</b>	<b>PV Costs (£m)</b>	<b>PV Benefits (£m)</b>	<b>NPV (£m, rounded)</b>
<b>Low estimate</b>	-10.8	N/A	Net positive
<b>Best estimate</b>	-22.5	+154.9	+132.5
<b>High estimate</b>	-55.0	N/A	Net positive

## 9. Unmonetised costs and benefits at the societal level

### 9.1. Certainty and effectiveness of delivery of support

46. The main benefit to exempt EILs by moving from compensation to implementing an exemption through changes to legislation is the (i) increased certainty from being exempt from a proportion of the costs of the RO scheme, and (ii) the way that support is provided which is more accurate and faster than compensation for each eligible firm, therefore improving the cash flow.
47. With regards to (i) the exemption will be set out in legislation thus it may provide greater certainty, compared with compensation. An exemption is not contingent upon departmental budgets which can fluctuate. For example, changing the exemption from RO costs would require Parliamentary approval.
48. Turning to (ii), the exemption also provides real time support thereby improving the cash flow in the short term, compared with compensation where eligible EILs are being compensated for historical consumption levels after a longer reconciliation process. There is also a delay supporting businesses since compensation is awarded quarterly after the indirect RO costs have been paid. Thus the exemption may help EILs' competitiveness as this real time support frees up working capital which can be deployed elsewhere. Secondly, the increased certainty may be able to raise or service debt at a lesser cost while maintaining their target debt service coverage ratios.
49. Taken together, this may lead to improved competitiveness, which benefits producers and consumers of energy-intensive goods. This increased certainty may also extend to more favourable business level decisions on output, employment as well as investment, compared with compensation.
50. A report by Vivid Economics (2014) [5], into the impact of exempting EILs from the costs of the Contracts for Difference (CfDs), found that there is "a value for money case for exempting some, but not all, energy-intensive sectors from CfD support costs. The costs to the economy will be negligible and the benefits from preserving competitiveness could be significant."

### 9.2. Administrative costs avoided by Government

51. The compensation scheme is administered by the Department for Business, Energy and Industrial Strategy (BEIS). The on-going administration costs associated with BEIS from maintaining this scheme include: assessing and processing applications for EIL certificates, receiving and checking: independent accountants' validation reports; quarterly declarations which declare any changes to the business or confirm that it is unchanged; annual reports; and processing the payment of compensation to businesses.
52. These administrative processes under the exemption scheme would be the same under the existing compensation scheme, thus there should be no additional familiarisation costs.

### **9.3. Administrative costs to eligible EIs**

53. Compensation imposes an administration cost on businesses: initial application for EI certificate to assess eligibility, quarterly declarations which declare any changes to the business or confirm that it is unchanged; annual reports and independent accountant reports that validate the information provided by the business.
54. The process has been designed to be robust and minimise the administrative burden by being proportionate to the applicant's electricity consumption. Our proposal is to permit businesses that have been assessed as eligible under the CfD exemption to be automatically eligible for an exemption from the RO scheme. Thus there will be a potential saving to eligible businesses by not having to comply with separate administrative rules for each exemption scheme.

### **9.4. Energy efficiency and carbon emissions**

55. Implementing an exemption lowers the marginal price of electricity for electricity-intensive businesses which in turn could reduce the incentive to invest in energy efficiency initiatives. The impact of implementing an exemption is unclear because there are already policy mechanisms in place, such as climate change agreements, which incentivise energy efficiency investment decisions. However, it would be reasonable to assume there may be some decrease in investment in energy efficiency measures.
56. Secondly, there may also be a 'rebound effect'. As the per unit electricity cost decreases as a result of the exemption, this may incentivise EIs to expand output and thereby increase carbon emissions.

### **9.5. Risk of production, investment and risk of carbon leakage**

57. When additional costs are imposed on energy-intensive industries, typically, the effects would first be felt in the form of 'production leakage'. This means that the 'asymmetric' cost impacting UK-based energy-intensive industries (EIs) would entail losses of market share to EU and non-EU competitors. That effect could first be felt in EU firms' export markets and later in the domestic markets (within the EU). 'Investment leakage' would ensue later as it would no longer be deemed profitable to invest in the UK. Before that an EI may decide to utilise capacity in its EU and non-EU jurisdictions or not carry out maintenance work. The most extreme forms of investment leakage could involve plant closures or even relocation of activities to countries without comparable CO<sub>2</sub> constraints.
58. In recent years a growing body of literature on carbon leakage has emerged. The sometimes highly divergent results regarding carbon leakage risks in specific sectors have nevertheless led some commentators to urge caution about placing too much reliance on simulations. The carbon leakage literature does not find sufficient data on carbon leakage.
59. The literature<sup>13</sup> finds that it is often difficult to distinguish the real drivers behind business decisions on production, investment and location and that it is therefore fraught with difficulty to attempt to disentangle decisions which could specifically be attributed to direct and/or indirect CO<sub>2</sub> costs. The carbon leakage literature also draws attention to a severe lack of data sources at both EU and national level that would be needed to better assess risks of carbon leakage.
60. According to the International Energy Agency [10], there are marked disparities in electricity prices for EIs between countries that can lead to significant differences in operating margins and potential returns on investment, especially where the output is transported over long distances at relatively low cost. In some cases, electricity prices can be the single most important factor in determining investment and production decisions.

### **9.6. Non-exempt businesses and competitiveness**

61. Whilst implementing an exemption reduces electricity costs to EIs, an exemption provided to industry will narrow the base of consumption, compared to compensation, from which RO support costs are recovered, and therefore increase electricity costs for non-exempt businesses.
62. The annualised value of the present value of net costs to business (EANCBS) from the exemption is not required for this IA, as it is a tax and spend measure.

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<sup>13</sup> A non-exhaustive list includes among others Ecofys, Cambridge Econometrics, Ökoinstitut, Delft, Entec, Fraunhofer, Carbon Trust, Climate Strategies. Most studies and reports deal with risks of carbon leakage (and possible remedies) resulting from direct CO<sub>2</sub> costs or direct CO<sub>2</sub> costs together with indirect CO<sub>2</sub> costs. For some summaries of parts of the literature see e.g. Cambridge Econometrics (2010) at pp. 5-17. For another summary of carbon leakage literature see Dröge (2009), p. 19.

- 63. Implementing an exemption increases the marginal price of electricity which may affect output, employment and investment decisions of these businesses. We are not able to quantify this impact given the lack of sufficient evidence.
- 64. Respondents to the consultation commented that the additional burden on non-exempt industry will impact competitiveness. This is because non-exempt businesses will have to deal with the double impact of continuing to pay for the renewables policy and having to subsidise others. However, no quantifications were provided.

## 10. Distributional impacts

- 65. This section sets out the distributional impacts, which are transfers and therefore not covered above, of implementing the exemption.

### 10.1. Impact on the exchequer

- 66. Table 7 below sets out the value of the exemption to EILs. This is the estimated aggregate amount of support provided to EILs that would be recovered from non-exempt businesses and households through higher electricity prices.

**Table 7: Estimated average value of exemption to EILs to the exchequer, per annum, £m, 2016 prices, over 2017/18 to 2027/28<sup>14</sup>**

	Low	Best	High
Option 1	£74m	£196m	£336m

- 67. The value of support under compensation and exemption is broadly the same. Therefore, under a compensation scheme, with the same criteria as exemption option 1, our best estimate is that the average annual costs to the Government would also be around £196m (see Table 7, over the ten year tenure of the policy); 1 January 2018 to 31 March 2028.
- 68. Therefore, moving from compensation to implementing an exemption saves the Government money since they are no longer paying EILs compensation; instead support would be provided indirectly by non-exempt businesses and households. Furthermore, the amount of money the Government saves from no longer paying compensation should equal the aggregate increase in the electricity bills of non-exempt businesses and households under an exemption. Therefore the direct benefit of no longer paying compensation should offset the aggregate cost.
- 69. Hence, in monetary terms, moving from compensation to implementing an exemption is a zero net cost. Implementing an exemption only redistributes who pays the support and not the cost of support provided.
- 70. In practice, the discounted costs of compensation to the exchequer and exemption to consumers may not match exactly due to timing issues. However, this is a transfer cost and should – according to HMT Green Book – not be counted.

### 10.2. Impact on average bills for households and non-exempt businesses

- 71. As set out above, implementing an exemption through changes to the RO legislation provided to eligible EILs will narrow the base of consumption, compared to compensation, from which RO support costs are recovered, and therefore increase electricity costs for non-exempt businesses and households, relative to what it would have been with compensation continuing.
- 72. On an aggregate level, the average annual value of the exemption to EILs is set out in table 7 above. On a per MWh basis we estimate that without the exemption the cost of the RO would over the ten year tenure would be around 17.4/MWh (2016 prices) and when introducing the exemption it would rise to around £18.2/MWh (in 2016 prices) over the same period. This in turn is dependent on the amount of exempt electricity supplied to EILs (see Table 1). The present value (PV) of these policy costs to consumers is set out in brackets below the best estimates of the average annual non-discounted value of the exemption.
- 73. Respondents to the consultation asked for more transparency around the electricity bill impacts, especially on households (such as dual fuel and electricity only); we have thus expanded the analysis. The impact, over the 10 year tenure of the policy, on average bills by affected group is summarised in the tables 8 and

<sup>14</sup> These estimates have been derived by multiplying the RO policy cost per megawatt hour (see tables 2 and 4) of electricity and then by the estimated electricity supplied to EILs (see Table 1).

9 below<sup>15</sup>. It should be noted that the estimates shown below are dependent on the level of RO costs, electricity demand (see Table 1) and the final design and scope of the exemption. The exemption has no effect on the level of RO under the Levy Control Framework, it is simply reallocating those costs between different groups of electricity consumers.

74. In relative terms, the impact on average annual electricity bills for non-exempt businesses and households varies, compared with the reference case (see Table 3). For the average dual fuel household, which consumes an average of 3.5 MWh per annum, the absolute average annual impact could be around £2.3. The equivalent increase on the average annual electricity bill, compared with no exemption, is set out in brackets in table 8. For electricity only households, where we assume an average annual of consumption of 5.4 MWh<sup>16</sup>, their respective absolute average annual impact could be around £3.9 per annum.

Please note that these relative estimates are based on prices published as part of the HMT Green Book.

**Table 8: Estimated annual increase on average bills by affected group in Great Britain, Option 1 (20% electricity intensity threshold), £ 2016 prices, non-discounted, over 2017/18<sup>17</sup> - 2027/28**

	Low estimate	Best estimate	High estimate
<b>Average impact across all households</b>	£0.9	£2.3 (+0.2%)	£3.9
<b>Average impact across electricity only households<sup>18</sup></b>	£1.4	£3.9 (+0.7%)	£6.7
<b>Small business energy user</b>	£60	£160 (+0.2%)	£270
<b>Medium-sized energy user</b>	£2,500	£6,700 (+0.4%)	£11,500
<b>Large sized energy user</b>	£23,400	£62,900 (+0.6%)	£107,400

75. Two respondents to the consultation provided estimates of the average increase for household electricity bills. One estimated that the impact would be equivalent to an annual increase of around £12 per annum; while another thought it would be around £7 per annum. However, these estimates were based on our previous estimates of electricity consumed by EIs and including FITs costs.
76. Some respondents also mentioned that the uncertainty due to the short notice of the exemption, combined with the uncertainty around when and if state aid clearance will be granted for direct competitors, may lead to suppliers needing to apply a risk premium to tariffs. However, no quantifications were provided. We believe that suppliers may 'price in' the higher scenario (see Table 8). Yet, there may be some differentiations between length of contracts and between energy suppliers, depending on financial position and appetite for competition.

### 10.3. Households and fuel poverty

77. The impact of an exemption on fuel poverty for households will depend on how much domestic electricity prices increase. Table 8 shows the range of electricity price impacts on average energy bills, with higher price impacts expected to have a larger impact on fuel poverty than smaller ones.
78. Fuel poverty is a devolved issue and each country in Great Britain has its own indicator of measuring the problem. In England, where the Low Income High Costs (LIHC) indicator is used<sup>19</sup>, we estimate that the

<sup>15</sup> The definitions of small business energy user, medium sized energy user and large sized energy user are based on the definition from 'Eurostat' (Eurostat size band IB): A small business energy user is defined as consuming between 20MWh and 499MWh electricity per annum (the midpoint was used in the impact assessment); a medium-sized energy user defined as using 11,000 MWh electricity (the midpoint was used in the impact assessment); and a large sized energy user is defined as using 100,000MWh electricity.

Link: <http://ec.europa.eu/eurostat/web/products-datasets/-/ten00117>

<sup>16</sup> BEIS assumes that electricity only households consume an average of around 5.43 MWh per annum. This is based on the 'Household Electricity Survey, A study of domestic electrical product usage', [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/208097/10043\\_R66141HouseholdElectricitySurveyFinalReportiss ue4.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/208097/10043_R66141HouseholdElectricitySurveyFinalReportiss ue4.pdf)

<sup>17</sup> This only includes January to March 2018.

<sup>19</sup> More detail available in the Fuel Poverty National Statistics Report for England: <https://www.gov.uk/government/statistics/annual-fuel-poverty-statistics-report-2016>

impact on the number of households in fuel poverty would be small. This is because LIHC is a relative indicator, and changes in electricity prices affect all households, not just those in fuel poverty.

79. The impact on the fuel poverty gap<sup>20</sup> – a measure of the depth of fuel poverty in England – could however be greater. Depending on the scope of eligibility for the exemption, the impact on the aggregate fuel poverty gap could vary from being small (low change in electricity prices) to an increase of around £8m per year (2013 prices) by 2026 (high change in electricity prices). This is compared to the do nothing baseline. The fuel poverty gap for a fuel poor household is the difference between the household's energy cost and the national median. In this case the estimate of £8m refers to the increase in the aggregate gap.
80. The impact on fuel poor households that heat their homes using electricity would likely be greater than those using mains gas or a non-metered fuel such as oil. We estimate that 75% to 85% of any increase in fuel poverty gap will fall on electrically heated homes. This implies that the exemption will increase the depth of fuel poverty for electrically heated homes, having a lesser impact on homes using mains gas or non-metered fuels.
81. It has not been possible to undertake estimates of the fuel poverty impacts in Scotland and Wales; however we would expect them to be broadly similar in magnitude to those of the fuel poverty gap in England.

#### **10.4. Energy suppliers and competitiveness**

82. The proposed changes to the supplier obligation calculations will result in a higher individual supplier obligation for non-EII electricity to offset the up to 85% exemption for EII. This will ensure that the availability of ROCs will continue to match demand and the ROC value will not change.
83. Suppliers may, through the switch from compensation to exemption, be faced with some uncertainty in the short term on the visibility of changing costs. At present the RO is set six months in advance of the Obligation year which provides some visibility. In the domestic retail market the majority of customers are on standard variable tariffs, which means the supplier may increase the cost of the tariff at any time, though they must give a month's notice of any increase.
84. However, the fixed term tariff market is becoming increasingly attractive to customers as smaller suppliers are competing hard with large established suppliers. Some of the independent suppliers have around 80% of their customers on fixed term tariffs. Tariffs may be fixed for 1, 2 or 3 years. In the non-domestic market a greater proportion of customers are on fixed term tariffs, some of which may be fixed for as long as 5 years.
85. The introduction of the exemption will increase the costs for domestic and non-domestic suppliers (which do not supply electricity-intensive industries) and may affect their competitiveness. This is because it may be more difficult for smaller suppliers with a high proportion of customers on fixed term tariffs to manage these increased costs in the short term than for the larger suppliers with a large number of customers on standard variable tariffs. In addition, smaller suppliers are likely to have smaller balance sheets than the larger companies which are likely to make it more difficult for them to manage unanticipated changes in costs to supply.

### **11. Summary**

86. Moving from compensation to implementing an exemption scheme through changes to legislation does not alter the overall value of the support provided to EIIs, but changes how this support is paid for. This is a shift from taxpayers to electricity bill payers, which consist of non-exempt businesses and households.
87. The benefit to EIIs of implementing the exemption by changes to the RO legislation is increased certainty and real time support from the costs of RO. This is because an exemption is not contingent upon departmental budgets which can fluctuate.
88. The effects are twofold: Firstly, as EIIs will be supported in real time this frees up working capital which can be deployed elsewhere. Secondly, the EII may be able to raise or service debt at a lesser cost while maintaining their target debt service coverage ratios which we have quantified in this IA (see section 8.1). However, it has not been possible to model to what extent these benefits to EIIs will lead to wider macro-economic benefits.
89. Non-exempt households and businesses, however, will see an increase in their electricity bills. There are also some additional administrative costs to energy suppliers as well as Ofgem through introducing the exemption. There is also a small impact on fuel poverty as well as a potential short term impact on the competitiveness of non-exempt business and energy suppliers.

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<sup>20</sup> Further detail on the fuel poverty gap and its measurement can be found in the Fuel Poverty National Statistics Report for England: <https://www.gov.uk/government/statistics/annual-fuel-poverty-statistics-report-2016>

90. In this impact assessment we are able to quantify the distributional impact, some benefits to ELLs as well as additional administrative costs from moving from compensation to exemption. The NPV ranges, set out in table 6, capture the additional administrative costs of introducing an exemption and some benefits to ELLs.
91. The NPV calculations do not, however, capture the distributional impacts on the exchequer, households and non-exempt businesses (see Table 8), as these are transfers. Furthermore, it is important to note that the wider society-level benefits of exempting ELLs rather than compensating them could not be quantified at this stage. This is due to a lack of evidence on linking the relative value of the exemption to improvements in competitiveness and thus impacts on output, employment as well as investment. Thus the presented NPV ranges (see Table 6) have to be considered alongside the unmonetised impacts, as well as the distributional impacts on non-exempt households and businesses.

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## **Annex B – Eligible sectors**

**Table A – List of eligible EISs by NACE code, Source: Department of Business, Energy and Industrial Strategy (BEIS)**

<b>NACE code (v2.0)</b>	<b>Description</b>
0510	Mining of hard coal
0811	Quarrying of ornamental and building stone, limestone, gypsum, chalk and slate
0899	Other mining and quarrying n.e.c.
1106	Manufacture of malt
1310	Preparation and spinning of textile fibres
1320	Weaving of textiles
1395	Manufacture of non-wovens and articles made from non-wovens, except apparel
1610	Sawmilling and planing of wood
1621	Manufacture of veneer sheets and wood-based panels
1712	Manufacture of paper and paperboard
1722	Manufacture of household and sanitary goods and of toilet requisites
1920	Manufacture of refined petroleum products
2011	Manufacture of industrial gases
2013	Manufacture of other inorganic basic chemicals
2014	Manufacture of other organic basic chemicals
2015	Manufacture of fertilisers and nitrogen compounds
2016	Manufacture of plastics in primary forms
2017	Manufacture of synthetic rubber in primary forms
2060	Manufacture of man-made fibres
2221	Manufacture of plastic plates, sheets, tubes and profiles
2222	Manufacture of plastic packing goods
2311	Manufacture of flat glass
2313	Manufacture of hollow glass
2314	Manufacture of glass fibres
2319	Manufacture and processing of other glass, including technical glassware
2320	Manufacture of refractory products
2331	Manufacture of ceramic tiles and flags
2332	Manufacture of bricks, tiles and construction products, in baked clay
2349	Manufacture of other ceramic products
2351	Manufacture of cement
2352	Manufacture of lime and plaster
2399	Manufacture of other non-metallic mineral products n.e.c.
2410	Manufacture of basic iron and steel and of ferro-alloys
2420	Manufacture of tubes, pipes, hollow profiles and related fittings, of steel
2431	Cold drawing of bars
2432	Cold rolling of narrow strip
2434	Cold drawing of wire
2442	Aluminium production
2443	Lead, zinc and tin production
2444	Copper production
2445	Other non-ferrous metal production
2451	Casting of iron
2452	Casting of steel
2453	Casting of light metals
2454	Casting of other non-ferrous metals
2611	Manufacture of electronic components
2720	Manufacture of batteries and accumulators

## **Annex C – Estimating the value of certainty from introducing an exemption for EILs from the RO costs through change in legislation**

1. The certainty of cash flow benefit from exemption will make these cost savings less risky with a return on capital perspective. It may help companies raise cheaper capital for longer and enable them to factor these into their long-term revenue and cost projections with confidence.
2. While noting that the benefits of this certainty cannot be abstracted from the wider microeconomics of the enterprises in question and that the effect will vary greatly between companies and for the same company at different points in time, we have come up with a generalised approach to arrive at an estimate (best case scenario) which we discuss in this paper.
3. Starting with the list of eligible EILs, their compensation for 2016 and assuming the annual level of compensation stays the same for each of the companies over the policy horizon of 10 years, we calculate the Net Present Value (NPV) of the benefits. Given the benefit stream from compensation is likely to be perceived as less certain, we discount this at a higher required rate of return equal to the companies' Costs of Equity (CoEs).
4. We repeat the calculation for exemption but use the companies' Weighted Average Costs of Capital (WACCs) for discounting. WACCs are lower than the corresponding CoEs and our rationale in using them is that the risk perception of these benefits is likely to be the same as that of the overall company, its ability to operate and benefit from this policy.
5. We aggregate the NPV impact of compensation and exemption for the set of EILs. For a subset of EILs that are privately owned, details about capital structure, WACC and CoEs are not readily accessible. We therefore extrapolate the results by scaling it up by proportion of electricity consumption for which WACC or CoE data is not available.
6. We also present the numbers in per MWh basis, where we use WACCs to discount the consumption stream to capture its time value.
7. The aggregate NPV impact of moving from compensation to exemption is summarised below, when assessed over a period of 10 years (see Table 1).
8. When only including eligible EILs for which WACC data is publicly available (which accounts for over 82% of eligible consumption), then the impact was calculated to be around £162m (NPV) over the ten year period.
9. On extending the result to companies with no available WACC data (i.e. scaling up based on the eligible consumption in MWh), the total impact was calculated as £154.9m (NPV).
10. The cumulative NPV of the compensation stream discounted at the CoEs of the respective companies over the same period stood at £1.03bn. Therefore we infer that with the risk-return perspective, exemption leads to approximately 15% improvement in the value of this benefit to the EILs over the 10 year period.
11. We have not been able to provide a low and high estimate due to data limitations.

**Table 1 – Aggregate impact of moving from compensation to exemption**

Total consumption for companies with WACC data available	9,377,158	MWh
Total consumption for companies w/o WACC data	2,058,613	MWh
Total compensation for companies with WACC data available	130,161,697	£m
Total NPV impact for companies with WACC data available	126,938,147	£m
NPV of compensation for companies with WACC data available	843,742,771	
Total £/MWh impact for companies with WACC data available	1.81	£/MWh
NPV impact extrapolated to companies w/o WACC data	154,905,495	£m
NPV of compensation extrapolated to companies w/o WACC data	1,028,973,722	
Relative impact as a % of NPV of compensation	15.04%	